

PATENT
54008.8012.US01
P96-0015US2

REMARKS

Claims 98-100, 102-106 and 119-130 are pending in the application. The claimed methods all include spraying a semiconductor article, wafer, or workpiece with a heated aqueous solution in combination with the use of ozone, as described at pages 12-14 of the application. Reconsideration and withdrawal of the rejections are requested in view of the following remarks.

Turning to the § 112 rejections at paragraph 3 of the Office Action, Applicant submits that the term "heated aqueous solution" is not indefinite. When a term of degree is presented in a claim, a determination must first be made as to whether the specification provides some standard for measuring that degree. If it does not, a claim is still not indefinite if one of ordinary skill in the art would be reasonably apprised of the scope of the invention (see MPEP § 2173.05(b)).

Pages 13 and 14 of the application clearly delineate the meaning of the term "heated aqueous solution." For example, the application recites, "the temperatures [of the cleaning liquid] used are elevated above room temperature and less than 200° C., more preferably the temperature range is from about 50° C to about 200° C, even more preferably from about 75° C to about 150° C, still more preferably from about 90° C to about 140° C."

Thus, the term "heated aqueous solution," as defined in the specification, clearly refers to a liquid solution having a temperature elevated above room temperature, most preferably between about 90° C to about 140° C. Additionally, one of ordinary skill in the art would be reasonably apprised of the scope of the invention, since the term "heated" is commonly used to describe the state that a solution is in when its

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temperature is elevated above normal, e.g., above room temperature. Thus, claims 98-100, 102-106, and 119-130 are not indefinite.

Turning to the § 103 rejections at paragraph 5 of the Office Action, the cited combination of references does not teach or suggest spraying a semiconductor article with a heated aqueous solution while exposing the article to ozone. Indeed, Ohmi et al. specifically teaches away from spraying a solution onto a semiconductor article. For example, Ohmi et al. states, "In the case of spraying, it is estimated that a chemical solution does not uniformly cover an object to be cleaned because it is fed in the form of a fog and therefore cleaning at a high cleanliness cannot be achieved" (col. 4, lines 60-63)."

Additionally, Ohmi et al. states "the inventor of the present invention attempted... feeding several drops of a chemical solution onto the [wafer] surface instead of spraying the chemical solution onto the surface. As a result, it was found that the number of contamination sources in the case of dropping feed was less than the number of contamination sources in the case of spraying" (col. 4, lines 13-19, emphasis added). Furthermore, Ohmi et al. states that its nozzle rack is "not the spraying type" (col. 9, lines 53-56).

Thus, Ohmi et al. clearly teaches away from using a spraying method, and teaches using a feeding method instead of spraying. Accordingly, Ohmi et al. cannot properly be combined with a reference that teaches spraying (e.g., cited JP '927) to yield the claimed methods ("It is improper to combine references where the references teach away from their combination" MPEP §2145(X)(2)).

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JP '927 discloses a method of spraying hot sulfuric acid onto the surface of a wafer in an ozone-containing atmosphere. JP '927, which teaches spraying a cleaning liquid onto the wafer, cannot properly be combined with Ohmi et al. to yield the claimed methods, because Ohmi et al. specifically teaches away from using a spraying method, such as that taught by JP '927. Moreover, JP '927 does not teach or suggest several of the claimed steps, such as rotating a wafer, or forming a thin aqueous film on the wafer with a heated aqueous solution.

In view of the foregoing, it is submitted that the claims are in condition for allowance, and a Notice of Allowance is requested.

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